

# Requirements Document

for

## Automated Flight Service Station

### Voice Switch



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## **1. BACKGROUND**

Automated Flight Service Stations (AFSS) provide a variety of services to users of the National Airspace System (NAS). These services include pilot weather briefings, real time weather advisories, search and rescue assistance, flight planning, broadcast messages, lost aircraft orientation, issuance of notices to airmen, and communications services to commercial, general aviation and military pilots. The fundamental objective of AFSS facilities is to provide services critical to the conduct of safe and efficient flight.

Mission Need Statement (MNS) 320, Voice Switching Capability for Flight Service Stations, dated August 5, 1997, calls for the sustainment of the voice switching capability in the AFSS facilities through the next decade while taking advantage of performance and capability enhancements. The current voice switching capability is provided by Type III Integrated Communications Switching Systems (ICSS) that were manufactured by Litton AMECOM and Denro, Inc. and installed in 61 AFSS. The Litton equipment is approaching 15 years of age and there are concerns about the cost of maintaining this equipment beyond June 2002. The Denro equipment will reach the end of its projected life cycle in approximately 2005.

In addition to sustaining and enhancing current voice switch capabilities, a new AFSS capability will be added. This is the ability for the voice switch to transfer, or off load, one AFSS air-to-ground (A/G) and related intra-facility ground-to-ground (G/G) functions to another AFSS where they can be controlled and operated. (These G/G functions do not refer to nor will they effect the capability to re-route the 1-800 lines used for briefing in the AFSSs) This is a very important aspect of the Federal Aviation Administration's (FAA) Air Traffic Services Concept of Operation (CONOPS) for the National Airspace System (NAS) in 2005, as identified by the Flight Service Architecture Core Group Report dated April 30, 1998. This report refers to the concept of reducing hours of operation at some AFSSs. The NAS Architecture 4.0, Chapters 17 and 25.1.3, also refers to the transition from the ICSS to a digital technology and the Voice Switch Replacement System (VSRS). The VSRS will provide the intrafacility functionality that is required to support the CONOPS.

### **1.1 Approach to the Acquisition of a New Voice Switch**

The Office of Communications, Navigation, and Surveillance Systems, AND-320 Product Team for Voice Switching / Recording, will use this document to solicit the vendor community and determine the most efficient means that will satisfy the FAA's requirements. Ultimately, a contract will be awarded to procure the voice switch.





## **2. OPERATIONAL CONCEPT**

### **2.1 General**

The Automated Flight Service Station Voice Switch (AFSSVS) will provide two basic types of Air Traffic Control (ATC) operational communications functions to the individual positions within the AFSS. These are air-to-ground (A/G) and ground-to-ground (G/G). In order to execute the communications that are necessary, the Air Traffic Control Specialists (ATCSs) will use various combinations of headset, handset, speaker and microphone devices to receive incoming voice and/or transmit voice messages on interphone, public telephone circuits, direct and indirect access circuits and air/ground radio communications circuits.

#### **2.1.1 Touch Entry Display**

A Touch Entry Display (TED) will be used to control the AFSSVS. The TED will be used to perform all selection and display functions. A major enhancement to the current system that will be provided by the AFSSVS TED is the capability to configure any AFSSVS position from the AFSS supervisor position to allow access to either or both of the AFSSs A/G or G/G communications capabilities.

ATCSs will manage radio frequencies using the TED. This will be accomplished by enabling/disabling a frequency (or group of frequencies), selecting main/standby transmitters/receivers, selecting audio routing and receiver volume level, and enabling/disabling muting controls.

The TED will display A/G, G/G and dialing functions on separate screens that are accessed through function buttons. A “solution box” containing location identifiers, frequency values and select/deselect functions will appear on an activity screen when an incoming call is received.

The AFSSVS will provide the capability to search for specific frequencies. This capability will be accessed and displayed using a function button on the TED. The AFSSVS will also provide the capability to display on the TED a history of A/G frequencies used at each ATCS position for the past 15-minute period. This history will be accessible through a function button.

#### **2.1.2 Log On and Diagnostics**

The AFSSVS will provide a position log-on capability for each AFSS ATCS. It will also provide a manually selected automated position diagnostic test function. The diagnostics will confirm the proper operation of a position. This will include verification of the proper operation of the AFSSVS and position lighting features. Neither the diagnostic process nor the log on process will cause service interruptions of A/G communications or changes to pre-set position

configurations.

### **2.1.3 Supervisor's Position**

The supervisor's position will be able to control and monitor the AFSSVS. It will incorporate all of the functions and capabilities of the ATCS positions and also have additional capabilities.

The AFSSVS will provide the supervisor's position with the capability to create, modify, and implement operational configurations for the AFSS and specific ATCS positions. The capability to do this will be enabled by entering "ID" pass codes into the AFSSVS. The AFSSVS will also provide the supervisor's position with the capability to archive, display, and print configuration changes to the AFSS and individual ATCS positions.

The AFSSVS will provide the capability for the supervisor's position to monitor AFSSVS fault indications, alarms. In addition, the AFSSVS will notify the supervisor position when an A/G frequency is not being monitored by any ATCS position.

The AFSSVS will provide the supervisor's position with the capability to selectively monitor and record the voice communications activities taking place at the ATCS positions. This monitoring and recording will be independent of the primary AFSS voice recorders.

### **2.1.4 ATCS Position**

The AFSSVS will provide the capability for any AFSS position to be configured to perform any function as assigned by the supervisor, ie. A/G, G/G, or use the government furnished Automatic Call Director (ACD). In the event that the AFSS supervisor determines that an ATCS position configuration needs to be changed due to operational requirements, the AFSSVS will be electronically notified of the pending change. A positive acknowledgement, via electronic means, from the ATCS operating the position targeted for reconfiguration, will be required before the AFSSVS will accept and implement the change to the position's configuration.

The AFSSVS will provide each ATCS position the capability to monitor and use up to 200 A/G frequencies. The individual active frequencies will be displayed on the TED. The switch will provide the capability to display multiple active frequencies in a list format.

The AFSSVS will provide each ATCS position with the capability to monitor and use up to 120 G/G lines. The individual active lines will be displayed on the TED. The switch will provide the capability to display multiple active lines in a list format.

The AFSSVS will provide each ATCS position with the capability to initiate telephone calls. This will be accomplished by the ATCS selecting individual interphone circuits and manually

dialing or direct dialing to establish voice communications. ATCSs will have the capability to answer and release incoming calls directed to their positions. The switch will also provide each position with call features such as speed dial, call hold, call forward, call override, caller identification, and conference calls.

The AFSSVS will provide the capability for locking out access to the functions at each ATCS position when it becomes unattended. This will occur when a push-to-talk (PTT) device is not plugged into a position's handset or headset jack. The position's full capabilities will be restored unchanged from previous settings when a PTT device is inserted into the jack box.

### **2.1.5 Maintenance Position**

An AFSSVS maintenance position will be located in the Airway Facilities maintenance area in the backroom of the AFSS. This position will have the same capabilities as the supervisor position with the exception of some voice recording and frequency monitoring functions. In addition, it will be capable of performing automatic fault diagnostics, isolation of faults to the Lowest Replaceable Unit (LRU) level, recording and storing AFSSVS fault information, displaying and recording error messages, and continuously displaying a visual status of the AFSSVS state of operation. The maintenance terminal will be automatically notified of any system fault.

### **2.1.6 Recording**

The voice communications processed by the AFSSVS will be automatically connected to the primary AFSS voice recorders. The AFSSVS will also provide the capability to manually connect with the primary AFSS voice recorders for the purpose of position relief recordings. This function will enable the recording of the dialog that is exchanged between an ATCS who is operating an AFSS position and another ATCS who is assuming the duties of the same position.

### **2.1.7 Training Capabilities**

The AFSSVS will provide dual voice receive/transmit capabilities at each ATCS position. This capability will enable a trainer to monitor a trainee's voice transmissions during headset and handset operations and preempt the trainee's voice transmissions if necessary. When the trainer preempts the trainee, the trainee will continue to have a receive capability.

### **2.1.8 Air-to-Ground Communications**

A/G communications will be used to transmit instructions and clearances to aircraft, communicate with aircraft in distress, assist pilots with flight planning, provide pilots with weather information, and disseminate and receive pilot weather reports (PIREPs).

The AFSSVS will provide each ATCS position the capability of initiating and receiving A/G radio communications. This will be accomplished by the ATCS selecting an individual radio circuit or circuits via the TED, activating the circuit(s) by a push-to-talk device to transmit, and receiving incoming voice transmissions that are directed to the position. Radio communications will be established using dedicated telecommunications circuits. ATCSs will have the capability to monitor the status and usage of the circuits.

### **2.1.9 Ground-to-Ground Communications**

The AFSSVS will provide each ATCS position the capability of initiating and receiving G/G communications. This will be accomplished by the ATCS selecting an individual G/G circuit or circuits via the TED, activating the circuit(s) by a push-to-talk device to transmit, and receiving incoming voice transmissions directed to the position. The G/G ATCS positions will be used to make intercom calls within the AFSS, interphone calls outside of the AFSS, and external network calls using outside phone lines. The majority of G/G voice communications will be conducted over public telephone lines, and circuits such as direct and indirect access circuits will be used for communication within the AFSS and for connection to external facilities. ATCSs will have the capability to monitor the status of usage for all of the circuits.

Some G/G positions will be used to conduct preflight briefings. This capability will be provided by the AFSSVS interfacing with the AFSS Automatic Call Director (ACD) and the Voice Retrieval System (VRS). The ACD distributes incoming telephone requests for briefings to the staffed preflight briefing positions. The ATCS either conducts the briefing or the request is directed to the VRS. The VRS provides pre-recorded announcements, weather data, and aeronautical information.

### **2.1.10 Air-to-Ground and Ground-to-Ground Communications**

The AFSSVS will provide the capability for the ATCSs to simultaneously use both the A/G and G/G communication functions. An example where this capability will be used is when an ATCS who is working an A/G position assists an in-flight pilot by obtaining an Air Traffic Control (ATC) clearance using the G/G capabilities of the AFSSVS. This capability will be provided to all ATCS positions in the AFSS.

### **2.1.11 AFSSVS Interface with Telecommunication Networks**

The AFSSVS will provide the capability to interface with existing interphone networks consisting largely of government-furnished point-to-point and multi-unit lines. These circuits provide the capability for ATCSs to establish voice communication on circuits specified for use by the FAA. This includes Direct/Indirect Access circuits. These circuits provide the capability

for the AFSSs to instantly access internal and/or external priority circuits.

The AFSSVS will provide the capability to interface with external telephone networks such as Private Automated Branch eXchange (PABX) and the Federal Telephone System (FTS). It will also interface with private phone companies and government-furnished A/G communications equipment and other legacy equipment. Public access to the AFSSs will be via toll-free or local telephone numbers. Other special telephone numbers will be designated for use by an AFSS. Examples include Search and Rescue and airport managers. Telephone calls associated with these numbers will be routed via the ACD to the appropriate AFSS positions.

#### **2.1.12 Transfer of A/G & G/G Communications Functions to other AFSSS**

The AFSSVS will provide the capability to reroute or transfer A/G communications frequencies and certain G/G functions between AFSSs. (The toll-free G/G lines used for preflight briefings will continue to be rerouted using the existing telephone equipment.) The AFSSVS will also provide the capability for AFSSs to receive the transferred communications frequencies and functions. Each AFSS will be capable of handling the A/G and G/G functions for multiple AFSSs. In each transferring scenario, the connections between each of the AFSSs are accomplished using a telecommunications infrastructure. The AFSSVS will provide the capability to configure individual AFSS positions with the capacity to handle their own daily traffic load or the increased traffic load of transferred communications.

When the need arises rerouting of the A/G and G/G communications functions will be accomplished at the AFSS supervisor positions. The supervisor at AFSS (A) will contact the supervisor at AFSS (B) and request permission to transfer communications functions. The AFSS (B) supervisor will reconfigure AFSS (B) to accept the communications functions from AFSS (A). After the reconfiguration at AFSS (B) is complete the supervisors will coordinate and wait for the opportunity when there is no A/G or G/G communications activities taking place at AFSS (A). The supervisor at AFSS (A) will activate the transferring sequence. The services provided will be transparent to the users of the AFSS.

#### **2.1.13 Operational Scenario for an A/G Position in the AFSS using the AFSSVS**

The ATCS assumes control of the A/G position and logs on to the AFSSVS. A LOG ON screen appears on the TED. This screen allows the ATCS to enter personal operating initials via an alphanumeric keypad. The automatic log on procedure loads the ATCSs user profile parameters such as TED brightness and contrast, frequency defaults, and other settings that are included in the user profile.

The ATCS leaving the position provides a position relief briefing to the ATCS assuming control of the position. The departing ATCS selects the RELIEF function button on the TED and the AFSS voice recorder records the briefing.

The ATCS selects the airspace sector or sectors that will be monitored from the position. This is accomplished by making a selection from a SECTOR LIST that is available via a function button on the TED. The SECTOR LIST will display all of the pre-configured sectors that are available for use at the AFSS. After a sector is selected only incoming radio calls on those frequencies assigned to that sector will be routed to that A/G position.

The ATCS receives a radio transmission, it is N12345 a General Aviation aircraft departing under Instrument Flight Rules (IFR) from Placerville (PVF), California enroute to Burbank (BUR), California.

When N12345 is ready for departure the pilot calls Rancho Murieta (RIU) AFSS on the Hangtown (KHNW) VOR. The pilot's transmission is routed to the A/G position that is assigned to monitor the KHNW VOR. The KHNW VOR frequency and the associated radio buttons are displayed on the ACTIVITY SCREEN of the TED. The radio function buttons include the frequency name and number, transmit select, headset/loudspeaker select, transmitter main/standby select, receiver main/standby select, and mute all others.

The ATCS selects the HEADSET/HANDSET function and the TRANSMIT function for the KHNW VOR frequency by depressing the associated buttons on the TED. This routes the incoming radio call to the headset that the ATCS is wearing and allows the ATCS to transmit back to the pilot of N12345. The ATCS keys the push-to-talk (PTT) device and acknowledges the pilot's communication.

The pilot of N12345 requests an IFR clearance from PVF to BUR. The ATCS acknowledges the receipt of the clearance request and informs the pilot to standby. The ATCS selects the TRANSMIT HOLD button on the TED and then selects the DIRECT ACCESS/INDIRECT ACCESS (DA/IA) button from the function row of the TED. The DA/IA SCREEN is then displayed on the TED allowing the ATCS to select a direct access line and dial the access code to the Flight Data position at Sacramento TRACON (SAC APCH). The Flight Data operator at SAC APCH issues the clearance to the A/G ATCS and the ATCS terminates voice communication with the flight data operator by activating a RELEASE button on the DA/IA TED screen.

The A/G ATCS releases the TRANSMIT HOLD button, activates the PTT device, and relays the IFR clearance to the pilot of N12345. The ATCS then removes the KHNW VOR frequency and function buttons from the ACTIVITY SCREEN by depressing the KHNW button on the TED. This action restores the KHNW VOR frequency defaults and re-sequences subsequent incoming radio transmissions on the ACTIVITY SCREEN.

## **2.2 AFSSVS Maintenance**

### **2.2.1 AFSSVS Maintenance Concept**

The maintenance concept for AFSSVS will be in accordance with FAA Order 6000.30B, *Policy for Maintenance of the NAS through the Year 2000*, as amended. It is anticipated that FAA Order 6000.30C, *National Airspace System Maintenance Policy*, which is in draft, will be signed in spring 2000. This order requires field, second level engineering, and depot level maintenance. It also includes the removal and replacement of defective Lowest Replaceable Units (LRUs) at the site level and repair of defective LRUs by government or contractor depot level maintenance.

### **2.2.2 AFSSVS Hardware Maintenance**

Airway Transportation System Specialists (ATSS) will perform site level maintenance. This will include scheduled preventative and unscheduled corrective maintenance and FAA approved modifications. The equipment will be of modular design. This will enable site level maintenance to be accomplished by the replacement of Lowest Replaceable Units (LRUs). Depot level maintenance will be provided for the repair of failed LRUs.

The AFSSVS will require no more than four (4) site visits per year for preventative maintenance. The AFSSVS will also provide an interface to the Remote Maintenance Monitoring System for monitoring, diagnostics, and maintenance.

Second level FAA engineering support will be provided. This will include hardware engineering support for the analysis and correction of problems as well as the evaluation of hardware modifications to correct problems or enhance system capabilities.

### **2.2.3 AFSSVS Software Maintenance**

Software maintenance modifications and upgrades proposed by the contractor, beyond those approved by the FAA at software product baseline, will be approved and tested by the designated FAA operational support organization during the life cycle of the AFSSVS.

Software maintenance for the AFSSVS will consist of two types: mission critical and support. The "mission critical" software element of the AFSSVS refers to the software (read-only memory (ROM) based firmware) that performs the processing and routing of voice communications, and position reconfigurations. This will be predominantly non-developmental embedded software that will not require any direct maintenance support by FAA personnel. New releases will be configuration controlled.



The “support” software elements of the AFSSVS capability are applications that perform secondary functions (e.g., communications traffic data processing and reporting, management information system data processing and reporting). These applications will be developed on common commercial hardware-software platforms.

Second level FAA engineering support will be provided. This will include software engineering support for the analysis and correction of problems as well as the evaluation of software modifications to correct problems or enhance system capabilities.

## **2.3 Quantities and Locations**

**2.3.1 The AFSSVS will be deployed to 61 AFSSs using a phased approach. The first 31 systems will be deployed to the AFSSs that currently have the Litton ICSS. The remaining 30 systems will be deployed to the AFSSs which currently have the Denro ICSS. (Key Parameter)**

**2.3.2 Four (4) AFSSVS systems will be delivered to the following locations for support purposes. Two (2) systems will go to the William J. Hughes Technical Center (ACT) in Atlantic City, New Jersey, and two (2) systems will go to the Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma, for use in training and operational support activities. Deploying AFSSVS systems at these locations will bring the total number of systems needed to 65. (Key Parameter)**

## **2.4 Schedule Constraints**

It is planned that the delivery of the AFSSVS to AFSSs that are currently using the LITTON ICSS will begin in the 2002 to 2003 timeframe.

### **3. TECHNICAL PERFORMANCE**

#### **3.1 System Startup**

3.1.1 The AFSSVS shall be capable of full functional operation within 5 minutes after electrical power is applied to the system.

#### **3.2 Backup Power**

3.2.1 The AFSSVS shall provide a backup power system that is independent of the AFSS standby power system.

3.2.2 The AFSSVS backup power system shall be capable of maintaining full operation of the system for at least 20 minutes after an AFSS main power and standby power system failure.

3.2.3 The AFSSVS shall automatically return to primary power when power is restored.

3.2.4 The AFSS shall automatically return to the individual AFSS position configurations that were in use prior to a restart after a power failure.

#### **3.3 Push-To-Talk (PTT) Devices**

3.3.1 The AFSSVS shall be capable of using government furnished PTT devices.

*Note: It must be verified that the AFSSVS is compatible with the impedance ratings of the PTT devices. Examples of PTT devices are handsets, headsets, footswitches and microphones and other peripherals currently in use.*

3.3.2 The AFSSVS shall provide each AFSS position with two independent audio jacks for connecting and operating PTT devices.

3.3.3 The AFSSVS shall provide side tone to each AFSS position audio jack only when they are used for voice transmissions via PTT devices.

3.3.4 The AFSSVS shall disable the operation of individual AFSS position TEDs until a PTT device is inserted into one of the position's audio jacks.

3.3.5 The AFSSVS shall route the audio received at the individual AFSS positions to the position speakers when a PTT device is not inserted into one of the position's audio jacks.

### **3.4 Audio**

3.4.1 The AFSSVS shall provide an independent volume control for each AFSS position audio jack.

3.4.2 The AFSSVS shall not introduce perceptible delays during voice transmission or reception.

3.4.3 The audio provided by the AFSSVS shall have limited noise, distortion, and interference in accordance with ANSI S3.2-1989 (R1999), *Method for Measuring the Intelligibility of Speech over Communications Systems*, and ANSI S3.14-1977 (R1997), *American National Standard for Rating Noise with Respect to Speech Interference*.

3.4.4 The AFSSVS shall provide each AFSS position with a loudspeaker and a loudspeaker volume control.

### **3.5 Inherent Availability**

3.5.1 The AFSSVS shall have inherent availability ( $A_i$ ) of .9999375 or greater.

### **3.6 Mean Time Between Failures**

3.6.1 The AFSSVS Mean Time Between Failures (MTBF) shall be greater than 8000 hours.

### **3.7 Mean Time to Restore**

3.7.1 The AFSSVS Mean Time to Restore (MTTR) shall be .5 hours or less in accordance with NAS-SR-1000, *FAA NAS System Specification*, Volume 1, paragraph 3.2.3.3.

### **3.8 Modular System**

3.8.1 The AFSSVS equipment shall be a scaleable system.

3.8.2 The AFSSVS equipment at AFSSs shall be scalable to meet the capacity needs for each individual AFSS.

*Note: Modularity and scalability are intended to provide flexibility in the size of any given AFSSVS, ie. Number of positions, A/G frequencies, G/G circuits, and memory.*

### **3.9 Frequency and Telephone Line Capacity**

#### **3.9.1 The AFSSVS shall be scalable to operate between 15 and 200 A/G main/standby transmitter frequencies. (Key Parameter)**

*Note: Example: The main and standby for 122.2 transmitter counts as one (1) frequency.*

#### **3.9.2 The AFSSVS shall be scalable to operate between 15 and 200 A/G main/standby receiver frequencies. (Key Parameter)**

*Note: Example: The main and standby for 122.2 receiver counts as one (1) frequency.*

#### **3.9.3 The AFSSVS shall be scalable to operate between 10 and 120 G/G telephone lines. (Key Parameter)**

### **3.10 Position Log-On/Log-Off**

3.10.1 The AFSSVS shall provide a log-on/log-off capability at each AFSS position

3.10.2 The AFSSVS log-on/log-off function shall be scalable to store and use between 20 and 120 ATCS user identification codes and associated user profiles.

*Note: ATCS profiles will consist of adjustable position settings such as volume, TED brightness, contrast, and any other user selectable parameters.*

3.10.3 The AFSSVS shall require the entry of valid ATCS identification (ID) code at each AFSS position before the position can be used for communications functions.

3.10.4 The AFSSVS shall provide the capability to create an ATCS profile based on the last adjustable position settings used by individual ATCSs.

3.10.5 The AFSSVS shall automatically set an AFSS position to the user's profile when a valid user identification code is entered at an AFSS position.

3.10.6 The AFSSVS log-on capability shall permit an ATCS to log-on to a position that is already logged on to by another ATCS without disrupting the operation of the position.

3.10.7 The AFSSVS shall become disabled at individual AFSS positions when a valid log-off user identification code is entered at the position.

### 3.11 Position Diagnostics

3.11.1 The AFSSVS shall provide the capability to manually select and execute an automated equipment diagnostic function at each AFSS position.

*Note: The diagnostics will check and verify that the position functions needed to operate in the AFSS environment are working. Examples include verifying the proper operation of the AFSSVS TED.*

3.11.2 The AFSSVS position diagnostics test shall not cause any interruption to the position's capability to perform A/G or G/G functions.

### 3.12 Touch Entry Display (TED)

#### **3.12.1 The AFSSVS shall provide a TED at each ATCS, maintenance, and supervisor position in the AFSS. (Key Parameter)**

3.12.2 The AFSSVS TED shall be a color display.

3.12.3 The AFSSVS TED shall display and use function buttons to execute the A/G and G/G and telephone capabilities of the AFSSVS.

3.12.4 The AFSSVS TED button size shall conform to the *FAA human Factors Design Guide*, DOT/FAA/CT-96-1, section 8.8.4.2.

3.12.5 The AFSSVS TED function buttons shall be displayed at all times when an ATCS is logged onto an AFSS position.

3.12.6 The AFSSVS TED shall have separate screens for A/G and G/G communications and telephone functions.

3.12.7 The AFSSVS TED shall automatically display separate A/G or G/G screens when incoming voice communications are received at an ATCS position.

3.12.8 The AFSSVS shall automatically route incoming voice communications to the appropriate TED A/G or G/G screen.

3.12.9 The AFSSVS shall provide a visual indication on the TED that another voice communication is waiting for acknowledgement when the ATCS is using an activity screen.

3.12.10 The AFSSVS shall require a positive acknowledgment from an ATCS to interrupt a voice communication activity that is in-progress at individual AFSS positions.

- 3.12.11 The AFSSVS TED shall display A/G frequencies and location identifiers.
- 3.12.12 The AFSSVS TED shall display A/G frequencies in megahertz (MHz) using at least seven (7) characters and a decimal point (example: 124.3250).
- 3.12.13 The AFSSVS TED shall display A/G location identifiers of frequencies using a minimum of five (5) alphanumeric characters.
- 3.12.14 The AFSSVS TED shall have a single activity screen that displays at least eighteen A/G frequencies simultaneously.
- 3.12.15 The AFSSVS TED shall provide access to A/G frequencies using a maximum of two entries on the TED.
- 3.12.16 The AFSSVS TED shall provide the capability to enable/disable frequencies, select main/standby transmitters/receivers, select audio routing, and enable/disable muting controls for each frequency that is displayed on the activity screen.
- 3.12.17 The AFSSVS TED shall visually indicate the frequencies that are selected at each individual AFSS position.
- 3.12.18 The AFSS TED shall provide the individual AFSS positions with a visual indication when A/G and or G/G voice communication transmissions are received at the position.
- 3.12.19 The AFSSVS TED shall provide a separate screen that will allow for the display and use of the frequencies that have been used at an individual AFSS position during the past 15 minute period.
- 3.12.20 The AFSSVS TED shall provide a separate activity screen that is used to control the AFSS ACD and VRS functions.
- 3.12.21 The AFSSVS TED shall provide a separate activity screen that displays and identifies G/G telephone lines by name and/or number using a minimum of eight numbers or alphanumeric characters.
- 3.12.22 The AFSSVS shall provide that capability to make Indirect Access (IA) telephone calls using the TED.

*Note: IA is accomplished by selecting a telephone circuit and dialing a phone number.*

3.12.23 The AFSSVS shall provide the capability to make Direct Access (DA) telephone calls using the TED.

*Note: DA is accomplished by making a single entry on the TED that automatically places phone calls to pre-specified locations.*

3.12.24 The AFSSVS TED shall provide the capability to individually select a minimum of 25 DA telephone lines.

3.12.25 The AFSSVS TED shall provide a visual indication of the state of the switch's IA and DA capabilities (i.e. idle, in-use, busy, on-hold)

3.12.26 The AFSSVS TED shall have separate brightness and contrast controls.

3.12.27 The AFSSVS TED shall be viewable under all AFSS lighting conditions including total darkness, filtered sunlight, and bright incandescent lighting.

### **3.13 Supervisor's Position**

3.13.1 The AFSSVS shall provide the capability for the AFSS supervisor's position to perform any or all of the functions that can be performed at the individual AFSS ATCS positions.

3.13.2 The AFSSVS shall provide the capability for the AFSS supervisor's position to create, modify, store, and execute reconfiguration plans.

*Note: A reconfiguration involves changing functionality of an AFSSVS at an AFSS position. The reconfiguration plan is a predetermined capability or task. Each position's AFSSVS can be subject to many plans.*

3.13.3 The AFSSVS shall provide the capability for the supervisor's position to configure any AFSS ATCS position to perform A/G and/or G/G functions.

3.13.4 The AFSSVS shall provide the capability for the AFSS supervisor's position to display the configurations at all of the individual AFSS ATCS positions.

3.13.5 The AFSSVS shall provide the AFSS supervisor's position with a series of "ID" password protected levels of access to information.

*Note: Examples of different levels of information include reconfiguration plans and status and fault isolation of equipment malfunctions.*

3.13.6 The AFSSVS shall provide the capability for the AFSS supervisor's position to archive, print, and display information related to configuration changes for all AFSS positions.

*Note: Examples include the positions where configuration changes were made, date/time of change, and frequencies that were moved to a position.*

3.13.7 AFSSVS archive data shall be available in an electronic format that is compatible with commercial database software and is capable of electronic transmission to facilities external to the AFSS.

3.13.8 The AFSSVS shall provide the capability for the AFSS supervisor's position to be notified of system malfunction alarms.

3.13.9 The AFSSVS shall provide the capability for the AFSS supervisor's position to be notified of malfunction alarms at each of the individual ATCS positions within the AFSS.

3.13.10 The AFSSVS shall report to the AFSS supervisor's position the identity of any A/G frequency that is not being monitored by at least one ATCS position.

3.13.11 The AFSSVS shall provide the capability for the operator of the AFSS supervisor's position to set DA telephone capabilities for each individual AFSS position.

3.13.12 The AFSSVS shall provide the capability for the operator of the AFSS supervisor's position to selectively monitor the voice transmissions taking place at any ATCS position.

3.13.13 The AFSSVS shall provide the capability for the AFSS supervisor's position to simultaneously make at least two ATCS position recordings independent of the AFSS multi-channel recorders.

### **3.14 Position Configuration**

3.14.1 The AFSSVS shall provide the capability to automatically check/validate reconfiguration plans to ensure that they can be executed.

3.14.2 The AFSSVS shall require a reconfiguration acknowledgment from the operator of each individual AFSS position where an ATCS is logged on before a position reconfiguration can be executed.

3.14.3 The AFSSVS shall provide a visual indication to each individual AFSS position that a pending position reconfiguration is awaiting acknowledgement from the ATCS logged onto the position.



3.14.4 The AFSSVS shall automatically perform reconfigurations at individual AFSS positions where an ATCS is not logged on.

### **3.15 Position Telephone Capabilities**

3.15.1 The AFSSVS shall provide the capability for individual AFSS positions to automatically receive override telephone calls at the position to which they are directed.

3.15.2 The AFSSVS shall provide the capability for the simultaneous reception of all override telephone calls to the AFSS position to which they are directed.

*Note: A position could receive several override telephone calls at the same time.*

3.15.3 The AFSSVS TED shall provide a visual indication to the individual AFSS positions when override telephone calls are in progress.

3.15.4 The AFSSVS shall provide a momentary audible signal at the individual AFSS positions when an override call is received.

3.15.5 The AFSSVS shall provide the capability for the operators of the individual AFSS positions to conference call a maximum of 10 individual telephone lines.

3.15.6 The AFSSVS shall provide the capability for the operators of the individual AFSS positions to connect an incoming telephone call to a telephone call that is progress.

3.15.7 The AFSSVS shall provide the capability for the operators of the individual AFSS positions to use speed dial to place telephone calls.

3.15.8 The AFSSVS shall provide the capability for the operators of the individual AFSS positions to automatically redial the last telephone number called from that position.

3.15.9 The AFSSVS shall provide the capability for individual AFSS positions to place telephone calls on hold except for override calls.

3.15.10 The AFSSVS shall provide the individual AFSS positions with a visual indication that telephone calls are on hold at that position.

3.15.11 The AFSSVS shall provide a visual identity (caller ID) of the origin of all incoming telephone calls at each AFSS position.

*Note: Caller ID signaling may not be available in all areas.*

3.15.12 The AFSSVS shall provide the capability for ATCSs operating the individual AFSS positions to forward telephone calls to other positions within the AFSS.

### **3.16 Position Audible Alerts**

3.16.1 The AFSSVS shall provide an audible and a visual indication at the individual AFSS positions when voice communications are received at that position via A/G, G/G, or telephone circuits.

3.16.2 The AFSSVS shall automatically terminate the audible and visual alerts at individual AFSS positions when incoming voice communications are acknowledged via a PTT device at that position.

3.16.3 The AFSSVS shall provide the capability for the AFSS supervisor's position to configure each ATCS position for different audible alerts.

3.16.4 The AFSSVS shall provide each ATCS position with the capability to mute and adjust the volume of audible alerts.

### **3.17 Alarm Indications**

3.17.1 The AFSSVS shall provide continuous visual status that confirms the proper operation of the system (ie. absence of faults), at the supervisors and maintenance positions.

3.17.2 The AFSSVS shall provide audio and visual fault alarms at the maintenance position and the supervisor's position whenever a fault occurs within the system.

3.17.3 The AFSSVS shall provide the capability to silence audio fault alarms without affecting future alarms.

### **3.18 Maintenance Position**

3.18.1 The AFSSVS maintenance position shall have the same functional capabilities as the individual AFSS ATCS positions and the AFSS supervisor's position.

3.18.2 The AFSSVS shall have the capability to automatically diagnose the cause of system faults.

3.18.3 The AFSSVS shall have the capability to identify failed Lowest Replaceable Units (LRU).

3.18.4 The AFSSVS shall provide for the ability to change out a failed LRU with out effecting the operation.

3.18.4 The AFSSVS shall have the capability to automatically translate the cause of system faults into error messages.

3.18.5 The AFSSVS shall display, at the maintenance position, error messages that indicate the cause of system faults.

3.18.6 A printer shall be installed at the maintenance position.

3.18.7 The AFSSVS shall print error messages on the maintenance position printer.

3.18.8 The AFSSVS maintenance position shall provide the capability for maintenance personnel to inject signal into and measure signals out of external system interfaces for testing purposes.

3.18.9 The AFSSVS maintenance position shall electronically record and store all fault information.

*Note: Examples of fault information are error codes, time failed, etc..*

3.18.10 The fault information stored at the maintenance position shall be retrievable by electronic means.

### **3.19 Position Recording**

3.19.1 The AFSSVS shall provide the capability for each AFSS position to record position relief briefings on the main AFSS voice recorders.

*Note: This function records the official dialog that is exchanged between an ATCS who is departing a position and another ATCS who is taking over the operation of the position.*

3.19.2 The AFSSVS shall connect all of the receive and transmit voice capabilities of each AFSS position to the main AFSS voice recorders.

3.19.3 The AFSSVS shall interface the main AFSS voice recorders with a voice level equal to or greater than the level of voice output from the individual AFSS positions.

*Note: The signals recorded on voice recorders must meet the optimum record level characteristics required for maximum playback clarity and intelligibility. The position*

*output level will be defined by the recorder's input signal specifications.*

3.19.4 The AFSSVS shall record outgoing audio from individual AFSS positions only when a PTT device is active.

### **3.20 Position Training Capabilities**

3.20.1 The AFSSVS shall provide the capability for two ATCSs (a trainer and a trainee) to simultaneously operate the PTT capabilities of the receive and transmit voice functions at the individual AFSS positions.

3.20.2 The AFSSVS shall provide the capability for a trainer at an AFSS position to override a trainee's PTT voice communications activities.

*Note: When conducting ATCS training in the AFSS environment it may become necessary for a trainer to interrupt a trainee's voice transmission and complete the communication activity in place of the trainee.*

3.20.3 The AFSSVS shall provide the capability for a trainee at an AFSS position to have receive capabilities if the trainee's voice communications are overridden by a trainer.

### **3.21 Air-to-Ground Communications**

3.21.1 The AFSS shall provide the capability for individual AFSS positions to transmit on more than one A/G frequency simultaneously.

3.21.2 The AFSSVS shall provide the capability for an ATCS to select and use a group of A/G frequencies for simultaneous transmissions at the position they are operating.

3.21.3 The AFSS shall provide the capability for an ATCS to use a single action on the AFSSVS TED to select each A/G frequency that is to be grouped for simultaneous transmission at position they are operating.

3.21.4 The AFSSVS shall key all the transmitter frequencies that are selected at an individual AFSS position whenever a PTT device at that position is activated.

3.21.5 The AFSSVS shall provide the capability for an ATCS to simultaneously select or de-select, using a single action on the TED, all A/G frequencies assigned to the AFSS position they are operating.

3.21.6 The AFSSVS shall provide a visual indication of the available/not available status of the individual main and standby A/G transmitters for each frequency that is assigned for use at each individual AFSS position.

3.21.7 The AFSSVS shall provide the capability for an ATCS to select and use either the main or standby transmitter for each A/G frequency assigned to the AFSS position they are operating.

3.21.8 The AFSSVS shall provide a visual indication of the available/not available status of the individual main and standby A/G receivers for each frequency that is assigned for use at each individual AFSS position.

3.21.9 The AFSSVS shall provide the capability for an ATCS to select and use either the main or standby receiver for each A/G frequencies assigned to the AFSS position they are operating.

3.21.10 The AFSSVS shall provide the capability for an ATCS to select and deselect a hold function for each individual A/G frequency assigned to the AFSS position they are operating.

*Note: This capability will be used to put A/G communications on hold while the ATCS is retrieving information for pilots from a G/G source.*

3.21.11 The AFSSVS shall provide the capability for an ATCS to select any A/G frequency that is designated for use by the position they are operating.

## **3.22 Frequency Lockout**

**3.22.1 The AFSSVS shall prevent more than one A/G position from transmitting on any individual A/G frequency at the same time.**

*Example: If an ATCS at one AFSS position is transmitting on frequency 122.2 and another ATCS at another AFSS position activates a PTT device and tries to transmit on 122.2 at the same time, the second ATCS will be prevented from transmitting on that frequency. This is known as "frequency lockout."*

3.22.2 The AFSSVS shall provide an audible indication of frequency lockout at the individual AFSS position(s) where the frequency lockout occurs.

3.22.3 The AFSSVS shall provide a visual indication of the specific frequencies being locked out at the individual AFSS position(s) where the frequency lockout occurs.

3.22.4 The AFSSVS shall provide the visual and audio frequency lockout indications for as long as a frequency lockout condition is occurring at an AFSS position.

3.22.5 The AFSSVS shall terminate frequency lockout when the A/G frequency that was locked out is available for use.

### **3.23 Incoming Receiver Audio Indication**

3.23.1 The AFSSVS shall provide a continuous visual indication of incoming receiver audio for each A/G receiver frequency that is assigned to each AFSS position.

### **3.24 Audio Mute**

3.24.1 The AFSSVS shall provide the capability to selectively mute(select/deselect) audio on all but one A/G audio source at an AFSS position.

3.24.2 The AFSSVS shall provide a visual indication to the ATCS that the mute all others function is selected.

3.24.3 The AFSSVS shall provide an audible indication at the supervisor's position when the mute all other function has been activated at any AFSS position.

3.24.4 The AFSSVS shall provide the supervisor's position with an adjustable time delay for the audible mute all others indication.

### **3.25 Ground-to-Ground Communications**

3.25.1 The AFSSVS shall incorporate the functionality of the government furnished ACD and VRS into all AFSS positions.

3.25.2 The AFSSVS shall provide the capability for an ATCS to select and deselect a hold function for each individual G/G circuit assigned to the AFSS position they are operating.

3.25.3 The AFSSVS shall provide the capability to establish, receive, and disconnect intercom, interphone, and external network calls at all AFSS positions.

### **3.26 Air-to-Ground and Ground-to-Ground Communications**

3.26.1 The AFSSVS shall provide the capability for A/G audio to be monitored on any G/G circuit at each AFSS position.

*Note: This is used to allow other than FAA agencies to monitor aircraft A/G transmissions using FAA's G/G equipment. For instance, Drug Enforcement Agency (DEA) officers may wish to monitor conversations of a suspect aircraft on an AFSS frequency.*

### **3.27 Audio Routing**

3.27.1 The AFSSVS shall be capable of routing audio received at a position to any audio output device in use at that position.

3.27.2 The AFSSVS shall provide a visual indication of the choice of audio routing at the ATCS position.

3.27.3 The AFSSVS shall provide the capability to manually select the automatic routing of incoming A/G receiver audio to the position loudspeaker whenever G/G communications activities are in progress at the individual AFSS positions.

### **3.28 Interface with Telecommunications Networks**

3.28.1 The AFSSVS shall interface with all government furnished voice communication circuits (digital or analog) used at the ATCS positions in AFSSs.

3.28.2 The AFSSVS shall interface with all external private telephone networks and the Federal Telephone System used at the ATCS positions in AFSSs.

### **3.29 Transfer of A/G Communications Functions to other AFSSs**

**3.29.1 The AFSSVS shall provide the capability to transfer A/G communications between AFSSs. (Key Parameter)**

### **3.30 Transfer of G/G Communications to other AFSSs**

**3.30.1 The AFSSVS shall provide the capability to transfer G/G communications between AFSSs. (Key Parameter)**

## **4. PHYSICAL INTEGRATION**

### **4.1 Real Estate**

The AFSSVS shall be installed into the existing AFSS buildings.

### **4.2 Space Requirements**

The physical size of the AFSSVS shall allow it to fit into the space currently occupied by the existing ICSS switch.

### **4.3 Installation**

The AFSSVS equipment shall be installed in accordance with section 6.2 of the *National Fire Protection Association* (NFPA), Standard 70, *National Electric Code* (NEC).

### **4.4 Console Compatibility**

The AFSSVS console space requirements shall be compatible with the existing AFSS consoles.

*Note: The AFSS consoles are in the process of being replaced.*

### **4.5 Operating Environment**

The AFSSVS installation and implementation shall be accomplished within the framework of National Environmental Policy Act (NEPA) of 1969 and FAA Order 1050.1, *Policies and Procedures for Considering Environmental Impacts*.

#### **4.5.1 Seismic Safety**

The AFSSVS shall meet the Seismic Safety requirements as stated in Executive Orders 12699 and 12941, *Seismic Evaluations of Existing Federally Owned and Leased Building*, as well as any local ordinances that apply.

#### **4.5.2 Safety Risk**

The AFSSVS shall meet the requirements of FAA Order 8040.4 “*Safety Risk Management*.”

### **4.6 Pollution Control Standards**

The AFSSVS shall comply with Executive Order 12088, *Federal Compliance with Pollution Control Standards*, Executive Order 12873, *Federal Acquisition, Recycling, and Waste Prevention*, and Code of Federal Regulations (CFR) Title 40 CFR *Environmental Protection*.

### **4.7 Energy Conservation**

The AFSSVS shall comply with Executive Order 13123, *Greening the Government Through Efficient Energy Maintenance*, and the Energy Policy Act of 1992.

### **4.8 Heating, Ventilation, and Air Conditioning**

The AFSSVS shall be designed to operate within the constraints of existing AFSS Heating, Ventilation, and Air Conditioning (HVAC) systems.



#### **4.9 Grounding, Bonding, Shielding, and Lightning Protection**

The AFSSVS grounding shall be in compliance with FAA-G-2100, *Electronic Equipment, General Requirements*, FAA-STD-020, *Transient Protection, Grounding, Bonding, and Shielding Requirements for Equipment*, ANSI/IEEE 1100-1992, *Powering and Grounding Sensitive Electronic Equipment*, and NFPA Standard 70, *National Electric Code*.

#### **4.10 Electromagnetic Interference (EMI)**

The AFSSVS shall neither cause electromagnetic interference in other systems, nor be affected by electromagnetic interference from other systems.

*Note: The specifics of this requirement will be further described in the specification document.*

#### **4.11 Electrostatic Discharge**

The AFSSVS shall not be affected by Electrostatic Discharge (ESD), as referenced in IEC-801-2 and tested according to IEC-1000-4-2.

*Note: The specifics of this requirement will be further described in the specification document.*

##### **4.11.1 Electrostatic Grounding**

The AFSSVS shall provide for the control and grounding of electrostatic charge buildup encountered during system operation and maintenance.

#### **4.12 Cables**

The AFSSVS shall use existing AFSS cable trays and cable routings.

##### **4.12.1 Electrical Work**

The AFSSVS shall meet the requirements of NFPA Standard 70, *National Electric Code*, FAA Order 6630.4 *En Route Communications Installation Standards Handbook*, and FAA specification FAA-C-1217F *Electrical Work, Interior*.

#### **4.13 Hazardous Materials**

The use of hazardous materials shall not be used in the design, manufacture, and installation of the AFSSVS, per 29 CFR 1910, unless specifically approved by the FAA.

##### **4.13.1 Identification of Hazardous Materials**

Components containing potentially hazardous materials to employees shall be identified per 29 CFR 1900.1200.

#### **4.14 Power Systems and Commercial Power**

The AFSSVS power requirements shall comply with NFPA Standard 70, *National Electric Code*, FAA Order 6030.20, *Electrical Power Policy*, FAA Order 6950.2, *Electrical Power Policy Implementation NAS Facilities*, and FAA Order 6950.25, *Power Conditioning Devices at FAA Facilities*.

##### **4.14.1 AFSS Power System**

The AFSSVS power shall be provided by the commercial power company serving the AFSS.

*Note: Each AFSS may have various form of backup power equipment, such as engine generators, uninterrupted power source or a power conditioning system.*

#### **4.15 Telecommunications**

The AFSSVS shall comply with FAA Order 6000.36, *Communications Diversity*.

##### **4.16 Telecommunications Interface**

The AFSSVS shall be able to interface with domestic as well as international telecommunications companies.

*Note: Some AFSSs have telephone connections with Mexico, South America, Canada, and European countries.*

#### **4.17 Emerging Communications Technologies**

The AFSSVS shall be able to integrate with emerging telecommunications technologies such as satellite, fiber optics, and digital infrastructures.

## **5. FUNCTIONAL INTEGRATION**

### **5.1 Integration with other NAS (and Non-NAS) Elements**

The AFSSVS shall interface with all legacy equipment.

*Note: Legacy is defined as all other government furnished equipment that the switch may need to interface with. (E.g. FSAS, ACD, VRS, facility recorders, National and International phone systems...) The ACD/VRS integration is described in sections 3.*

### **5.2 Software Integration**

The AFSSVS software integration specifications shall be contained in the system specification document.

### **5.3 Remote Maintenance Monitoring and Control**

The AFSSVS shall interface with the NAS Information Management System (NIMS) for the purpose of remote monitoring and control.

*Note: The level or depth of control will be determined jointly by the NIMS and AFSSVS Integrated Product Teams.*

## **6. HUMAN INTEGRATION**

### **6.1 Prototyping and Simulation**

Computer human interface (CHI) prototyping and simulation shall be used to ensure AFSSVS concept validation.

### **6.2 System Integration**

FAA Human Factors Design Guide (DOT/FAA/CT- 96/1), American National Standard for Human Factors Engineering of Visual Display Terminal Workstations (ANSI-100), and ANSI-S3.2, American National Standard Method for Measuring the Intelligibility Over Speech Communication Systems, shall be utilized for the specification development of the following system design features:

1. Physical, visual, and auditory interfaces and communication links among personnel, as well as between personnel and their equipment, under normal, adverse, and emergency conditions.
2. Provisions for reducing the physical stress effects of the task or job demands within the work environment (i.e., insulation from unnecessary vibration, noise, dust, glare, heat/cold; protection from excessive lifting or reaching; reduction of repetitive movements conducive to repetitive stress injuries).
3. Provisions for the reduction of psychological stress effects of the task or job demand within the work environment, as compared the current job activities, that induce unnecessary time pressures, way-finding confusion, ambiguity, annoying quirks, or unnecessary steps.
4. Location and layout of controls, displays, workspaces, maintenance access, and storage provisions shall comply with control-display compatibility guidelines.
5. Provisions for workstation adjustments that accommodate individual anthropometric differences between operators while affording the operator a means to change his/her workstation posture for positional rest and support.

### **6.3 Americans with Disabilities Act**

The AFSSVS shall comply with the Americans with Disabilities Act (ADA) of 1990.

### **6.4 Federal Accessibility Standards**

The AFSSVS shall comply with the Uniform Federal Accessibility Standards, FED-STD-795.

## **6.5 Employee Safety and Health**

### **6.5.1 OSHA**

The AFSSVS shall comply with Occupational Safety and Health Administration (OSHA) personnel safety guidelines defined in FAA-G-2100, *Electronic Equipment, General Requirements*, FAA Order 3900.19, *Occupational Safety and Health Program*, 29CFR 1910, *General Industry Standards*, and 29 CFR 1926, *Construction Standards*.

### **6.5.2 Health Protection**

The AFSSVS shall comply with radiation health hazard and protection requirements as defined in ANSI/IEEE C95.1, *IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz*.

## **7. SECURITY**

### **7.1 Security Policies**

The AFSSVS shall comply with FAA Order 1600.69, *Facility Security Management Program*, and Department of Transportation (DOT) Orders: DOT H 1350.250, *Guide to Establishing an Information System Protection Program*, DOT H 1350.251, *Departmental Guide to Developing an Information Systems Security Plan*.

### **7.2 NAS Information Security (INFOSEC)**

The AFSSVS shall comply with paragraph 805 of FAA Order 1600.54, *FAA Automated Information Systems Handbook*, Chapter 8; FAA Order 1600.66, *Telecommunications and Information Systems Security Policy*; and, Office of Management and Budget (OMB) Circular A-130, *Security of Federal Automated Information*, Appendix III.

*Note: Upon approval, FAA Order 1370.82 will replace FAA Order 1600.54 and 1600.66.*

### **7.3 Personnel Security**

All personnel security policies, requirements and procedures, as stated in FAA Order 1600.1, *Personnel Security Program*, shall be adhered to.

## **8. SYSTEM SAFETY MANAGEMENT**

The Office of Architecture and System Engineering, ASD-100, and the Plans and Performance Directorate, Strategic Requirements Division, ARX-100, are in the process of devising a System Safety Management strategy for AFSSVS.

### **8.1 System Safety Management Plan**

ASD-100 and ARX-100 shall coordinate a System Safety Management plan with the AFSSVS Integrated Product Team.

## **9. IN-SERVICE SUPPORT**

### **9.1 Logistics Support**

The AFSSVS system shall be subject to FAA Order 1800.58, *National Airspace Integrated Logistics Support (NAILS) Policy*.

### **9.2 Staffing**

Airway Facilities (AF) maintenance workload staffing levels shall be determined utilizing FAA Order 1380.40, *Airway Facilities Sector Level Staffing Standards System*.

### **9.3 Site Spares**

Site sparing shall be determined in accordance with FAA Order 6000.38, *Policy to Determine NAS Equipment Sparing Requirements for Airway Facilities Work Center*.

### **9.4 Test Equipment**

The AFSSVS shall be maintainable with common tools and test equipment (e.g. multimeters, oscilloscopes, transmission test sets) already in the FAA inventory, limiting the need for new specialized test equipment.

### **9.5 Technical Instruction Books**

Concurrently with the delivery of systems to each site and support facilities, the vendor shall provide and deliver Technical Instruction Books (TIBs) in accordance with FAA STD 2494, explaining installation, operation, maintenance and use of the AFSSVS hardware and software consistent with the operations and maintenance concepts.

#### **9.5.1 Operators Manuals**

Operator manuals, as determined through the NAILS process, shall be provided and delivered concurrently with the system to each site.

#### **9.5.2 Second Level Maintenance Documents**

Second level hardware and software maintenance documentation shall be delivered to the second level support entity.

#### **9.5.3 Specifications, Engineering Drawings, and Test Procedures**

An escrow data package including specifications, engineering drawings and associated lists, engineering changes, and test procedures shall be maintained by the AFSSVS prime contractor and available to the FAA.

#### **9.5.4 Training**

Training shall be developed to provide Air Traffic (AT) and AF personnel with the knowledge, skills, and abilities to install, test, operate, and maintain the AFSSVS, system and subsystem equipment.



### **9.5.5 Second Level Engineering Training**

Second level engineering training shall be provided.

*Note: Procurement of second level engineering support training will be a Program Office initiative. This is expected to be non-recurring training.*

### **9.6 Maintenance**

Maintenance of the AFSSVS shall be performed in accordance with FAA Order 6000.15, *General Maintenance Handbook for Airway Facilities*.

*Note: The FAA Airway Facilities personnel will be trained and equipped to perform on-site maintenance and certification services at individual AFSS sites. The training will include the ability to analyze and resolve equipment problems, service degradation, and to conduct required certification in synchronization with the AFSSVS operational deployment. Technical specialists will remove and replace suspect LRUs and ship them to the depot for appropriate repair.*

#### **9.6.1 Level Of Repair Analysis**

The vendor for the AFSSVS shall develop a Level of Repair Analysis (LORA) for approval by the Airway Facilities Requirements Management Team (AFRMT).

### **9.7 Site Maintenance**

The AFSSVS shall provide the capability for the accomplishment of on-site maintenance by a single technician.

#### **9.7.1 Maintenance Impact**

The AFSSVS shall provide the capability to accomplish maintenance without adversely impacting operations (e.g. reporting failures, system anomalies, participation in service restorations, etc).

### **9.8 Packaging, Handling, Storage, and Transportation**

Packaging, Handling, Storage, and Transportation (PHS&T) shall be in accordance with ASTM-D-3951, *Standard Practice for Commercial Packaging*, and FAA Order 4650.30, *Management and Control of NAS Facilities and Equipment (F&E) Project/Material*.

#### **9.8.1 Marking**

All marking shall be in accordance with MIL-STD-129.

*Note: Marking includes (1) National Stock Number, (2) Quantity, (3) Unit of issue, and (4) Contract Number*

### **9.9 Interim Contractor Support**

Interim contractor support shall be provided to logistically support the AFSSVS during operations prior to Operational Readiness Demonstration (ORD).

#### **9.10 Certification**

The AFSS communications service shall be certified in accordance with FAA Order 6000.15, *General Maintenance Handbook for Airway Facilities*.

#### **9.11 Second Level Engineering Support**

Second level engineering, including hardware and software maintenance support, shall be provided as determined through the NAILS process.

#### **9.12 Engineering Tools**

Computer Aided Software Engineering (CASE), load generation, and diagnostic tools shall be provided as determined through the NAILS process.

## 10. TEST AND EVALUATION

Test and Evaluation (T&E) will be conducted to ensure that the functional and sub-network performance requirements can be met in an operational environment, and to resolve the Critical Operational Issues (COIs) defined within this document. The FAA in accordance with the Acquisition Management System (AMS) Test and Evaluation Process Guidelines will conduct T&E. AMS T&E policy and guidelines have been further defined and are delineated within the *WJHTC System Test and Evaluation (ST&E) Process Document* (FAA-iCMM PA08). This document is located in the FAA William J. Hughes Technical Center (WJHTC) iCMM Process Asset Library (PAL). The PAL can be accessed through the Internet at <http://tcpal.tc.faa.gov/>. ST&E planning and conduct shall be performed by ACT-340 following the WJHTC ST&E Process Document (FAA-integrated Communication Maturity Model (iCMM) PA08) and will involve all stakeholders.

### 10.1 Critical Operational Issues

This final Requirements Document (fRD) establishes the operational framework and performance requirements for satisfying the Mission Need for the AFSSVS. The Critical Operational Issues (COIs) contained herein reflect the major areas to be considered for test and evaluation. As defined in the AMS T&E Guidelines, COIs are key operational effectiveness or suitability issues expressed in the form of questions that reflect controversies and uncertainties about system capabilities, practicability, environmental effects, etc. COIs are examined in tests during the solution implementation phase to determine a product's capability to perform its mission. The operational requirements developed for the AFSSVS shall be traceable up to the identified COIs. The AFSSVS COIs will be allocated to a particular test event for verification.

The following Critical Operational Issues (COIs) have been identified for the AFSSVS:

#### **COI-1: AFSS Operations Support**

Does the AFSSVS support the planned operational concept?

#### **COI-2: NAS Interfaces**

Does the AFSSVS inter-operate with the existing radios, remote control equipment, voice recorders, automatic call directors, and other interfacing NAS systems.?

#### **COI-3: ATCS Interface**

Does the AFSSVS provide an AT/AF user interface that fully supports operations and maintenance?

#### **COI-4: Reliability and Availability**

Is the AFSSVS reliable and available such that it is suitable for incorporation into the NAS?

**COI-5: Maintenance Operations**

Can the AFSSVS be maintained adequately using the maintenance philosophy described in section 8 of this document, including the timely delivery of the technical maintenance and operational manuals?

**COI-6: Reconfiguration of Operations**

Does the AFSSVS provide the required system performance and human interface functionality to support the transferring of communications between sites?

**COI-7: Integration**

Can the AFSSVS be installed, optimized, and adapted to site conditions in AFSS facilities?

**COI-8: Safety**

Can the AFSSVS be safely operated and maintained?

*Note: All COIs identified in this section will be resolved successfully as a basis for the In-Service Decision (ISD).*

**10.2 Testing and Evaluation**

The FAA to evaluate system performance, operational effectiveness and suitability shall conduct Testing and Evaluation (T&E). T&E will include testing for compatibility, interoperability, degraded operations, maintainability, and supportability. T&E also identifies deficiencies in NAS hardware, software, human performance factors, COIs and/or operational concepts. T&E requirements shall be specified in accordance with the WJHTC ST&E Process Document (FAA-iCMM PA08) and maintained under the test programs included within this document (see 9.3).

**10.2.1 Operation and Capability Testing**

Operation and Capability (OCT) shall be conducted on the AFSSVS as part of the pre-award evaluation.

**10.3 Test Programs**

Testing of the AFSSVS shall be conducted in accordance with the guidelines established within the WJHTC ST&E Process Document. Testing will address four main components: Developmental Test, Operational Test, Production Acceptance Test, and Site Acceptance Test.

**10.3.1 Developmental Test**

Developmental Test (DT) shall be conducted in accordance with the WJHTC ST&E Process Document. DT shall be conducted to demonstrate that all technical and performance requirements specified in the contract have been met (both subsystem and system hardware and software requirements). DT shall be performed by the contractor and witnessed by the product team at the factory and/or at the WJHTC.

**10.3.2 Operational Test**

Operational Test (OT) shall be conducted in accordance with the WJHTC ST&E Process Document. OT shall be conducted to demonstrate that the AFSSVS is operationally effective and operationally suitable for use in the NAS and that the NAS infrastructure is ready to accept

the system. These tests focus on demonstrating that all operational requirements have been met and that all COIs have been resolved. OT is conducted under the direction of ACT-340 at the WJHTC and at designated key sites.

#### **10.3.3 Production Acceptance Test**

Production Acceptance Test (PAT) shall be conducted in accordance with the WJHTC ST&E Process Document. The vendor on each system shall conduct PAT before it leaves the factory. PAT will be a subset of the design qualification tests conducted on the first article plus quality control testing. These tests verify that the assembly line is producing units that have the same quality and performance as the first article system.

#### **10.3.4 Site Acceptance Test**

The vendor shall conduct Site Acceptance Test (SAT) with oversight by the FAA to ensure that the system is installed and functioning properly in preparation for site acceptance.

#### **10.4 Contract Acceptance Inspection**

Contract Acceptance Inspection (CAI) shall be conducted at all FAA sites where the AFSSVS is installed following successful completion of the SAT.

#### **10.5 Joint Acceptance Inspection (JAI)**

JAI shall be conducted by AT/AF following successful completion of field familiarization and will result in a declaration of Initial Operational Capability (IOC).

#### **10.6 Independent Operational Test and Evaluation**

Independent Operational Test and Evaluation (IOT&E) is an independent operational assessment that will be performed on new NAS system(s), per designation by the Associate Administrator for Air Traffic Services (ATS-1). After the successful conclusion of OT, ARA-1 declares the AFSSVS ready for IOT&E. This is done via the Independent OT&E Readiness Declaration (IOTRD) which is sent from the Associate Administrator for Research and Acquisitions (ARA-1) to ATS-1. As a result, the AFSSVS shall undergo IOT&E at, or near, the IOC declaration at the key site(s). IOT&E will be based on the COIs in this section.

#### **10.7 Field Familiarization Test**

AT and AF site personnel shall perform field familiarization to confirm readiness for integration of the AFSSVS into each NAS site, leading to AFSSVS commissioning.

## **11. IMPLEMENTATION AND TRANSITION**

### **11.1 Project Implementation Plan**

A Project Integration Plan (PIP) shall be in accordance with the FAA Product Integration Plan Template.

*Note: The PIP will contain sufficient detail to provide an understanding of the implementation strategy and plans, the physical and functional parameters, and the financial and operational impacts on the NAS, including the Generic Site Implementation Plan, and site specific plans.*

### **11.2 Site Integration**

Integration with existing equipment and facilities shall be the responsibility of the installation vendor under the direct guidance of the appropriate representative from the NAS Implementation Program Directorate (ANI) and FAA designated resident engineer.

### **11.3 Disposal of Type III ICSS**

Disposal shall be conducted in accordance with FAA Order 4800.2, *Utilization and Disposal of Excess and Surplus Personal Property*, and with the Defense Reutilization and Marketing Service (DRMS) Support Agreement NO. SC4403-960122-01.

## 12. QUALITY ASSURANCE

### 12.1 Quality Assurance Program

An AFSSVS Quality Assurance Program (QAP) shall be established and maintained in accordance with the requirements of ANSI/ASQC-Q-9001, and ISO-9000-3, “*Quality Management and Quality Assurance Standards*”, part 3; “*Guidelines for the Application of ISO 9001 to the Development, Supply and Maintenance of Software*,” and provide at a minimum:

1. A Quality Assurance (QA) organization that has the responsibility and authority to identify and evaluate quality problems, and to initiate, recommend, or provide solutions.
2. Procedures and controls to assure adequate configuration management during all operations through final acceptance.
3. Controls to assure that all inspection and testing are performed in compliance with contract requirements and that all test data is complete, correct, traceable, repeatable, and acceptable.
4. Maintenance of proper record keeping function to provide objective evidence and trace-ability of operations performed.
5. Procedures and controls for assuring that all software products of services procured from subcontractors conform to contract requirements.
6. Procedures and controls to assure that all documentation is adequately reviewed and meets contract requirements.
7. Procedures and controls for the prevention of software and system deficiencies, detection and analysis of deficiencies when they do occur, as well as procedures for corrective action.

## **13. CONFIGURATION MANAGEMENT**

### **13.1 Configuration Management**

Configuration Management of the AFSSVS shall be in accordance with FAA Order 1866, *Configuration Management Policy*



## **14. IN-SERVICE MANAGEMENT**

### **14.1 Monitoring, Assessment and Optimization**

Performance of the AFSSVS shall be monitored using NAS performance assessment systems and Government-furnished remote monitoring systems in accordance with FAA Order 6000.30, *Policy for Maintenance of the National Airspace System through the Year 2000*.

#### **14.1.1 Failure Summaries**

Failure summaries and analysis shall be provided to document trends in system reliability and logistics support.

#### **14.1.2 System Performance Evaluation.**

The FAA, stating measurable performance goals, shall develop an AFSSVS system performance evaluation plan defining resource needs, performance indicators, evaluation bases, and audit trails for measures.

## **Appendix I: Requirements Correlation Matrix**

*N/A: All requirements stated in this document are objectives.*

## Appendix II: Mission Needs Correlation Matrix

The Mission Needs/Requirements correlation matrix below traces needs statements from the Voice Switching Capability for Flight Service Stations Mission Needs Statement (MNS) #320 dated 5 August 1997, to the Requirements Document for Automated Flight Service Station Voice Switch (AFSSVS)

<b>Mission Need Statement Paragraph</b>	<b>RD Section</b>	<b>RD Requirement</b>
2b, 3b	Background	1.0
3b.	Maintenance	2.2
2b	Quantities and Location	2.3
3b, 9b	Schedule Constraints	2.4
3b, Table 1 #15, 23	Power/ Transfer of Communications	3.2 3.31
2b, 3b Table 1 #1,5,6,20	Supervisors Position/ Training	3.15, 3.22
2b, 3b, Table 1 #1,6	Interface w/ Telecommunications	3.30
2b, Table 1 #1, 3, 4	Interface w/ Telecommunications	3.30
2b, 3b, Table 1 #5,16,18	Supervisor Position	3.15
2b, 3b, Table 1 #5,16	Maintenance Position	3.20
2b, 3b, Table 1 #14	Performance	3.5, 3.6, 3.7, 3.8
2b, Table 1 #17	Audio	3.4
Table 1 #8,9	Audio	3.4
2b, 3a, 3b	Performance	3.5, 3.6, 3.7, 3.8
2b, 3a, 3b	Performance	3.5, 3.6, 3.7, 3.8
2b	Real Estate	4.1
2b, Table 1 #19	Space	4.2
2b	Installation	4.2.1
2b	Console Compatibility	4.3
2b	Operating Environment	4.4
2b	Pollution Control Standards	4.5
2b	Energy Conservation	4.6
2b	Heating, Ventilation and Air Cond.	4.7
2b, 3b	Grounding, Bonding, Shielding & Lightning Protection	4.8
2b, 3b	Electromagnetic Interference	4.9
2b, 3b	Electrostatic Discharge	4.10
2b	Cables	4.11
2b	Hazardous Materials	4.12

2b	Power Systems and Commercial Power	4.13
Table 1 #10,12	Telecommunications	4.14
Table 1 #10,12	Telecommunications Standards	4.14.1
3a 3b, Table 1 #3, 7, 13, 19	Integration with Other NAS and Non NAS Elements	5.1
2b	Software Integration	5.2
Table 1 #6	Human Integration	6.0
2b	Employee Safety and Health	6.5
3b	OSHA	6.5
2b	Physical Security	7.1
2b	Information Security (INFOSEC)	7.2
2b	Staffing	9.2
2b, 3b	Site Spares	9.3
2b, 3b	Equipment	9.4
2b	Technical Data	9.5
2b	Training	9.5.4
2b, 3a, 3b	First and Second Level Repair	9.5.5
2b	Maintenance	9.6
2b	PHS&T	9.8
2b	Interim Contractor Support	9.9
2b	Certification	9.10
2b, 3b	Second Level Engineering Support	9.12

## Appendix III: Definitions

**Activity Screen:** A screen on the TED that provides access to all of the functions of the AFSSVS.

**AFSS Positions:** The reference to AFSS positions refers to all the positions in the facility that are part of the AFSSVS regardless of function.

**ATCS:** Air Traffic Control Specialist. In the context of the AFSSVS Requirements Document this term is used to identify AFSS specialists and supervisors who will use the AFSSVS.

**Call Termination:** A call is “terminated” when the AFSSVS directs a call to a position and it is answered.

**Certification:** The technical confirmation that the service/system is providing, and/or is capable of providing, the specified service to a user at any given time. The completion of certification requires a confirming action by an authorized AF specialist.

**Certification Parameter:** Certification parameters are selected critical indicators of the quality of the required or advertised services being provided to the user of systems, subsystems, and equipment.

**Continuity:** The probability that the AFSSVS will perform its required function without unscheduled interruptions during the intended period of operations.

**Critical Failure:** Failure of a LRU that results in the loss of more than one AFSSVS asset (e.g. ATCS position, radio, or telephone circuit).

**Direct Access (DA):** A function by which an ATCS can place telephone calls to pre-designated positions by making a single entry on the TED.

**Electrostatic Discharge:** The sudden transfer of static electric charge (built up through mechanical friction or other means) between the AFSSVS and external entities (including personnel) or within the AFSSVS.

**Electromagnetic interference:** Means any failure by the AFSSVS to meet the functional and performance requirements, or impairment by the AFSSVS of other systems performance due to electromagnetic radiation.

**Indirect Access (IA):** A function by which an ATCS can place telephone calls by selecting a telephone circuit and dialing a phone number.

**Key Parameter:** Requirements that are designated for control by the Joint Resources Council (JRC). These requirements are critical to (1) achieving operational effectiveness and suitability, (2) meeting the needs of dependent elements of the NAS, (3) and accruing the benefits ascribed to the candidate solution or acquisition program.

**Line Replaceable Unit (LRU):** An item that may consist of a unit, an assembly (circuit card assembly, electronic component assembly, etc.), a subassembly, or a part, that is removed and replaced at the site-maintenance level to restore the operation of the AFSSVS after a failure.

**Lock Out:** A condition where an ATCS cannot transmit on a frequency because more than one ATCS is trying to transmit on the same frequency at the same time.

**Mean Time Between Failure:** A basic measure of reliability for repairable items. The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

**Mean Time to Repair:** This time includes diagnostic time, removal of the failed LRU, replacement and installation of the new LRU including any adjustments or data loading necessary to initialize the LRU, and all adjustments required to return the subsystem to normal operation and to perform certification.

**Mean Time to Restore:** The time spent restoring functionality, performance, and the operational state of the AFSSVS which existed prior to any failure.

**Maintenance Position:** The maintenance position shall be located in or adjacent to the central AFSSVS equipment so that the maintenance technician has easy access to test points, distribution frames, and other items that would not be available at a remote maintenance terminal. The maintenance position requires the capability to communicate on ATC telephone circuits and frequencies (as directed by ATC personnel) for test and maintenance purposes.

**Override Call:** An override call is a high priority call that is automatically connected to the called AFSS position regardless of the communications activities taking place at the position.

**Reliability:** The probability that the AFSSVS will perform its intended function.

**Relief Briefing:** This function records the official hand-off dialog that is exchanged between and ATCS who is departing an AFSS position and another ATCS who is taking over the operation of the position.

**Ring Down Call:** Ring down circuits are non-selective point-to-point circuits. These circuits may be either manual ring or automatic ring. The ATCS selects a ring down circuit and the call is automatically placed to the terminating end of the circuit.

**Side-tone:** Is the ability to hear ones self while transmitting while transmitting voice communications using a headset or handset.

**Solution Box:** An area on the TED A/G activity screen which provides for control of the select and deselect, transmit/receive, main/standby, and mute all others functions for a particular frequency.

**Supervisory Position:** AFSS positions used by supervisory personnel to: monitor the performance of the AFSSVS; create, edit, print, and execute new position configurations; create ad-hoc voice recordings; and, access AFSS communications assets. The supervisory positions shall generally be located among or near the ATCS positions for which the supervisor has authority.

**Supervisory Recording:** These recordings refer to the ad-hoc voice recording of ATCS position activity (with pauses removed) that allow supervisors to assess the performance of ATCSs by listening to their voice transmissions over a period of time. Supervisory recording is distinct from legal voice recording.

**TED:** A touch entry display that is used to access the functions of the AFSSVS.

**Unattended Position:** A condition that exists when there is no PTT device inserted into the audio jack(s) at an AFSS position

**VSRS:** Is the next generation Voice Switch Replacement System after the Terminal Voices Switch Replacement (TVSR) program expires in 2005.

## Appendix IV: Acronyms

<b>ACD</b>	Automatic Call Director
<b>ACT</b>	William J. Hughes Technical Center
<b>AF</b>	Airway Facilities
<b>AFRMT</b>	Airway Facilities Requirements Management Team
<b>AFSS</b>	Automated Flight Service Station
<b>AFSSVS</b>	Automated Flight Service Station Voice Switch
<b>A/G</b>	Air-to-Ground
<b>AMS</b>	Acquisition Management System
<b>ANI</b>	Office of NAS Implementation Program
<b>ANSI</b>	American National Standards Institute
<b>AOS</b>	Operational Support Service
<b>ARA</b>	Office of the Associate Administrator, for Research and Acquisition
<b>ARR</b>	Requirements Development and Investment Analysis Division
<b>ARS</b>	Air Traffic System Requirements Service
<b>AT</b>	Air Traffic
<b>ATCS</b>	Air Traffic Control Specialist
<b>ATS</b>	Air Traffic Services
<b>ATSS</b>	Airway Transportation System Specialist
<b>CAI</b>	Contractor Acceptance Inspection
<b>CASE</b>	Computer Aided Software Engineering
<b>CCB</b>	Configuration Control Board
<b>CFR</b>	Code of Federal Regulations
<b>CHI</b>	Computer Human Interface
<b>CM</b>	Configuration Management
<b>COI</b>	Critical Operational Issue
<b>DA</b>	Direct Access
<b>DEA</b>	Drug Enforcement Agency
<b>DOT</b>	Department Of Transportation
<b>DRMS</b>	Defense Reutilization and Marketing Service
<b>DT</b>	Developmental Test
<b>EMI</b>	Electromagnetic Interference
<b>ESD</b>	Electrostatic Discharge
<b>FAA</b>	Federal Aviation Administration
<b>FAALC</b>	Federal Aviation Administration Logistics Center
<b>F&amp;E</b>	Facilities and Equipment
<b>FRD</b>	Final Requirements Document
<b>FSACG</b>	Flight Service Architecture Core Group
<b>FSAS</b>	Flight Service Automation System

<b>FSS</b>	Flight Service Station
<b>FTS</b>	Federal Telephone System
<b>G/G</b>	Ground-to-ground
<b>GSIP</b>	Generic Site Implementation Plan
<b>HVAC</b>	Heating, Ventilation, and Air Conditioning
<b>IA</b>	Investment Analysis
<b>iCMM</b>	integrated Capability Maturity Model
<b>ICSS</b>	Integrated Communications Switching System
<b>IEC</b>	International Electromechanical Commission
<b>IEEE</b>	The Institute of Electrical & Electronics Engineers
<b>INFOSEC</b>	Information Security
<b>IOC</b>	Initial Operational Capability
<b>IOT&amp;E</b>	Independent Operational Testing and Evaluation
<b>IOTRD</b>	IO&T Readiness Declaration
<b>ISD</b>	In-Service Decision
<b>JAI</b>	Joint Acceptance Inspection
<b>JRC</b>	Joint Resources Council
<b>LOCID</b>	Location Identifier
<b>LORA</b>	Level of Repair Analysis
<b>LRU</b>	Line Replaceable Unit
<b>MHz</b>	Megahertz
<b>MNS</b>	Mission Needs Statement
<b>MTBF</b>	Mean Time Between Failure
<b>MTTR</b>	Mean Time to Repair
<b>NAILS</b>	National Airspace Integrated Logistics Support
<b>NAS</b>	National Airspace System
<b>NEC</b>	National Electric Code
<b>NEPA</b>	National Environmental Policy Act
<b>NFPA</b>	National Fire Protection Association
<b>OCT</b>	Operational Capability Test
<b>OMB</b>	Office of Management and Budget
<b>ORD</b>	Operational Readiness Demonstration
<b>OSHA</b>	Occupational Safety and Health Administration
<b>OT</b>	Operational Test
<b>PABX</b>	Private Automated Branch Exchange
<b>PAL</b>	Process Asset Library
<b>PAT</b>	Production Acceptance Test
<b>PBL</b>	Product Baselines
<b>PHS&amp;T</b>	Package, Handling, Storage and Transportation
<b>PIREP</b>	Pilot weather report
<b>PIP</b>	Project Implementation Plan
<b>PTT</b>	Push To Talk
<b>QA</b>	Quality Assurance
<b>QAP</b>	Quality Assurance Program



<b>QRO</b>	Quality and Reliability Officer
<b>RDVS</b>	Rapid Deployment Voice Switch
<b>RMMS</b>	Remote Maintenance Monitoring System
<b>ROM</b>	Read-only Memory
<b>SAT</b>	System Acceptance Test
<b>SSA</b>	Staffing Standards Analysis
<b>ST&amp;E</b>	System Test and Evaluation
<b>T&amp;E</b>	Test and Evaluation
<b>TIB</b>	Technical Instruction Book
<b>TED</b>	Touch Entry Display
<b>VRS</b>	Voice retrieval system
<b>VSRS</b>	Voice Switch Replacement System





